



Unit 3

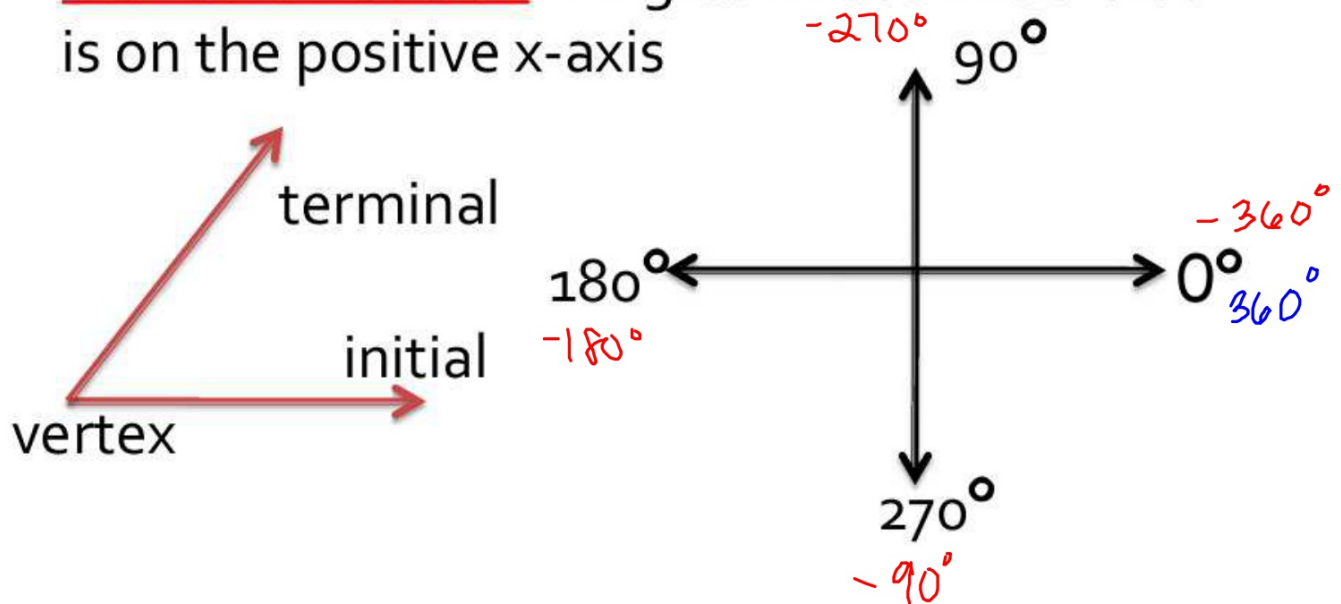
Triangle Trigonometry and the Unit Circle

Section 4.1

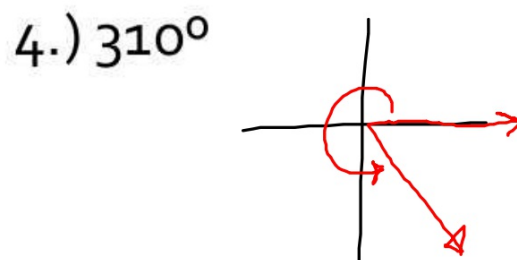
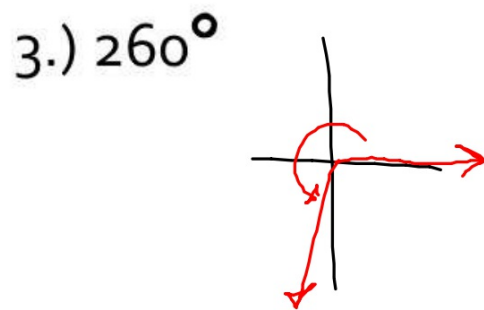
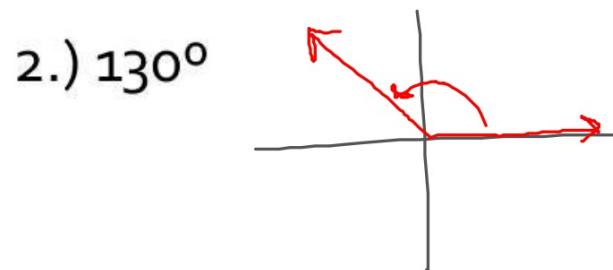
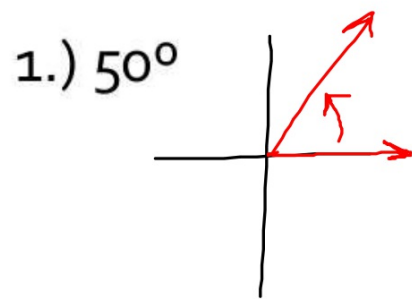
Radian and Degree Measure

Angles

- Trigonometry: the measurement of angles
- Standard Position: Angles whose initial side is on the positive x-axis

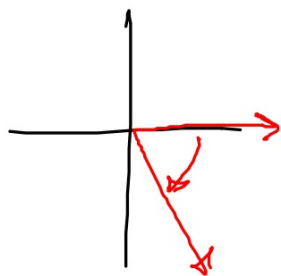


Graphing positive angles

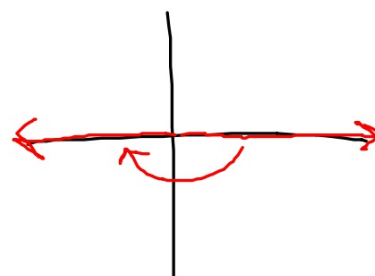


Graphing Negative angles

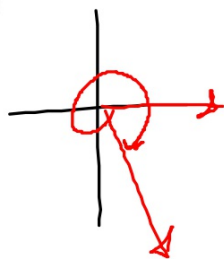
1.) -50°



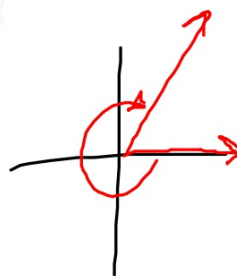
2.) -180°



3.) -420°



4.) -300°



Coterminal angles

- Angles that share the same terminal side
- Differ by 360° (or a multiple of 360 ie. 720)

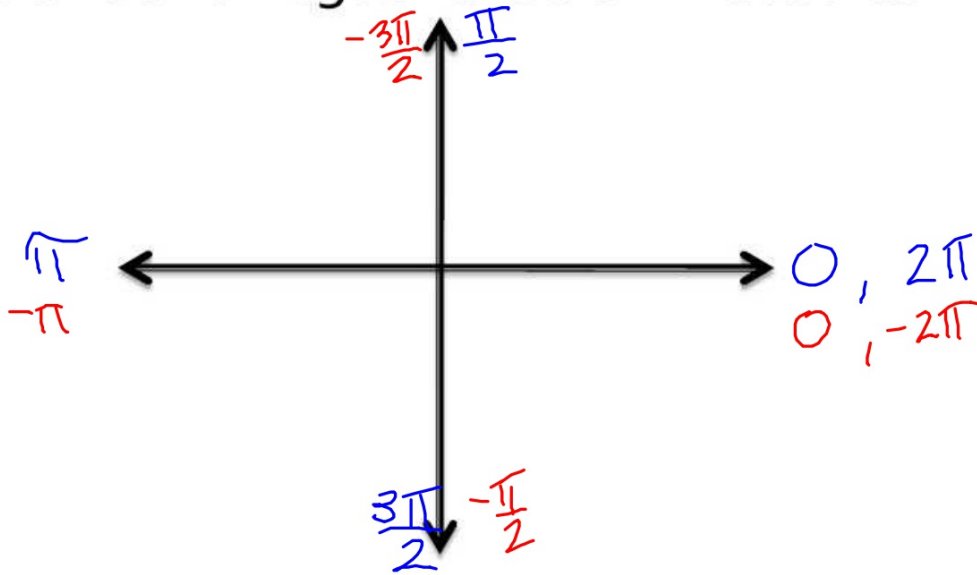
■ ~~Example 4 vs example 1~~

- To find positive and negative coterminal angles- add and subtract 360°

- 1.) 210°
 -150°
 570°
- 2.) -180°
 180°
 -540°
- 3.) 400°
 40°
 760° -320°

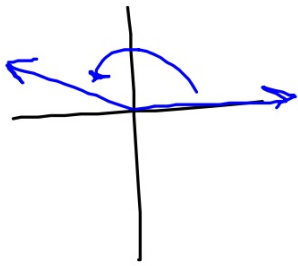
Radian Measure

- Radians are a 2nd way to measure an angle
- Positive and negative radian measures:

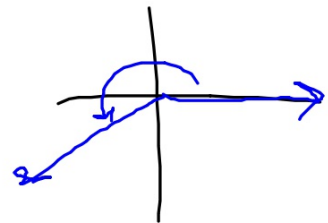


Graphing positive angles

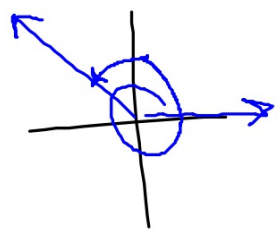
1.) $\frac{5\pi}{6}$



2.) $\frac{6\pi}{5}$

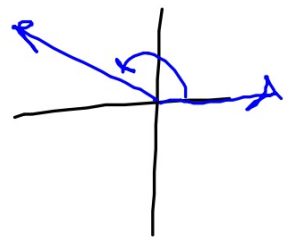


3.) $\frac{11\pi}{4}$

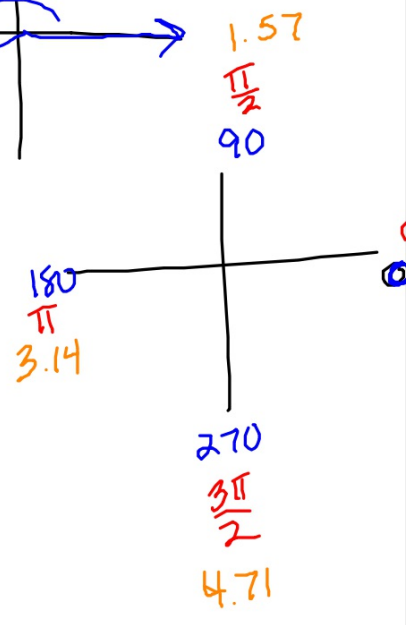


$$\frac{8\pi}{4} + \frac{3\pi}{4} + 2\pi$$

4.) 2.5



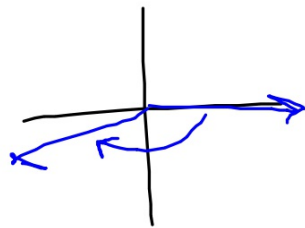
Radian Decimals



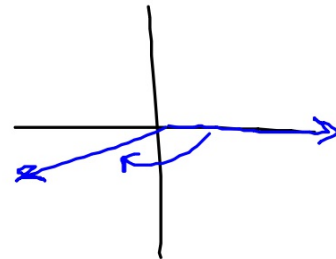
Graphing negative angles

Radian Decimals

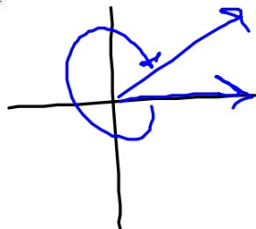
1.) $\frac{-5\pi}{6}$



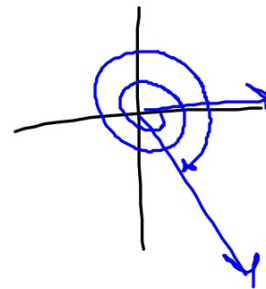
2.) -3



3.) $\frac{-9\pi}{5}$



4.) $\frac{-13\pi}{3}$



Coterminal angle with radians

- Differ by 2π
- To find a positive and negative coterminal angle, add and subtract 2π

1.) 3π
 $5\pi, \pi$
 $-\pi$

2.) $\frac{3\pi}{4} \pm 2\pi$
 $\frac{3\pi}{4} \pm \frac{8\pi}{4}$
 $\frac{11\pi}{4}, -\frac{5\pi}{4}$

3.) $\frac{-5\pi}{6} \pm 2\pi$
 $-\frac{5\pi}{6} \pm \frac{12\pi}{6}$
 $\frac{7\pi}{6}, -\frac{17\pi}{6}$

Conversions

- Degree to radian: Multiply by $\frac{\pi}{180}$

$$1.) \quad 60^\circ \cdot \frac{\pi}{180} = \boxed{\frac{\pi}{3}}$$

$$2.) \quad -150^\circ \cdot \frac{\pi}{180} = \boxed{-\frac{5\pi}{6}}$$

$$3.) \quad 540^\circ \cdot \frac{\pi}{180} = \boxed{3\pi}$$

- Radian to degree: Multiply by $\frac{180}{\pi}$

$$1.) \quad -\frac{\pi}{6} \cdot \frac{180}{\pi} = \boxed{-30^\circ}$$

$$2.) \quad \frac{7\pi}{4} \cdot \frac{180}{\pi} = \boxed{315^\circ}$$

$$3.) \quad \frac{15\pi}{7} \cdot \frac{180}{\pi} = \boxed{385.714^\circ}$$

Special angles

- Complementary angles- angles whose sum = 90
- Supplementary angles- angles whose sum = 180

1.) 45°
C: 45°
S: 135°

2.) 61°
C: 29°
S: 119°

3.) 100°
C: none
S: 80°

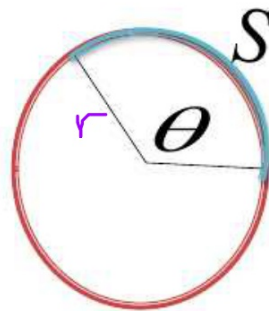
4.) $\frac{5\pi}{6}$ C: none
S: $\frac{\pi}{6}$

Arc Length

- Arc length- measures a segment (arc) of a circle

$$S = r\theta$$

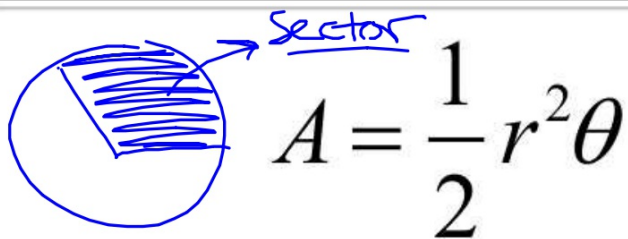
- θ must be in radians



- 1.) $r = 5, \theta = \frac{3\pi}{4}$
 $S = (5)\left(\frac{3\pi}{4}\right) = \boxed{\frac{15\pi}{4}}$

- 2.) $r = 3, \theta = \frac{4\pi}{5}$
 $S = 3\left(\frac{4\pi}{5}\right) = \boxed{\frac{12\pi}{5}}$

Area of a sector



1.) $r = 3, \theta = \frac{2\pi}{3}$

$$A = \frac{1}{2} (3)^2 \left(\frac{2\pi}{3}\right)$$

$$A = \frac{1}{\cancel{2}} \cdot \frac{\cancel{9}^3}{1} \cdot \frac{\cancel{2}}{3} \cdot \frac{\pi}{1}$$

$$A = 3\pi \text{ units}^2$$

$$\frac{120}{1} \cdot \frac{\pi}{180} = \frac{2\pi}{3}$$

2.) $r = 2, \theta = 120^\circ$

$$A = \frac{1}{2} (2)^2 \left(\frac{2\pi}{3}\right)$$

$$A = \frac{1}{\cancel{2}} \cdot \frac{\cancel{4}^2}{1} \cdot \frac{2}{3} \cdot \frac{\pi}{1}$$

$$A = \frac{4\pi}{3} \text{ u}^2$$

Classwork

- Pg 291 # 71-78

Homework

- Pg 290-91 # 8,10, 12-19, 21, 35-40, 43, 49-52, 80, 82, 87, 88, 91, 92